



An Exelon Company

Clinton Power Station  
R. R. 3, Box 228  
Clinton, IL 61727

10 CFR 50.73

U-603674  
June 16, 2004

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
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Clinton Power Station, Unit 1  
Facility Operating License No. NPF-62  
NRC Docket No. 50-461

Subject: Licensee Event Report 2003-003-01

Enclosed is Licensee Event Report (LER) No. 2003-003-01: Reactor Scram Due to Loss of Power to 480 Volt Unit Substation 1I. This report is being submitted in accordance with the requirements of 10CFR50.73.

Should you have any questions concerning this report, please contact Mr. William Iliff, Regulatory Assurance Manager, at (217)-937-2800.

Respectfully,

  
R. S. Bement  
Site Vice President  
Clinton Power Station

JLP/blf

Enclosure: Licensee Event Report 2003-003-01

cc: Regional Administrator – NRC Region III  
NRC Senior Resident Inspector – Clinton Power Station  
Office of Nuclear Facility Safety – IEMA Division of Nuclear Safety

JE22

## LICENSEE EVENT REPORT (LER)

(See reverse for required number of  
digits/characters for each block)

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NE08-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

## 1. FACILITY NAME

Clinton Power Station, Unit 1

## 2. DOCKET NUMBER

050 00461

## 3. PAGE

1 OF 4

## 4. TITLE

Reactor Scram Due to Loss of Power to 480 Volt Unit Substation 1I

## 5. EVENT DATE

## 6. LER NUMBER

## 7. REPORT DATE

## 8. OTHER FACILITIES INVOLVED

MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
12	02	2003	2003	003	01	06	16	04	None	05000
									None	05000

9. OPERATING  
MODE

1

## 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

10. POWER  
LEVEL

88

20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)
20.2203(a)(1)	50.36(c)(1)(i)(A)	x 50.73(a)(2)(iv)(A)	73.71(a)(4)
20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)
20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER
20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	Specify in Abstract below or in
20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)	NRC Form 366A
20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)	
20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)	
20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)	

## 12. LICENSEE CONTACT FOR THIS LER

## NAME

David H. Schavey, Operations Director

## TELEPHONE NUMBER (Include Area Code)

(217) 937-2200

## 13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX
B	KK	EHTR	C332	Y					

## 14. SUPPLEMENTAL REPORT EXPECTED

YES (If yes, complete EXPECTED SUBMISSION DATE)

X

NO

15. EXPECTED  
SUBMISSION  
DATE

## MONTH

## DAY

## YEAR

## 16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On December 2, 2003, at approximately 1700 hours, the reactor was manually scrambled from 88 percent power in response to low feedwater pump suction pressure and reactor pressure vessel (RPV) water level trending downward toward the RPV Low Water Level – Level 3 automatic scram setpoint. Initiating the event was a loss of power to the 480 Volt Unit Substation 1I (1AP19E) causing the 'B' turbine driven reactor feed pump (TDRFP) minimum flow valve to fail open. This resulted in a low pump suction pressure and a trip of both TDRFPs. The motor-driven reactor feed pump (MDRFP) automatically started to control water level and pressure. The cause of the 480 Volt Unit Substation 1I to trip was a lack of overload circuit protection (i.e., fuse protection) for a branch circuit due to a design error.

A second event occurred on December 2, 2003 at approximately 1937 hours when a RPV Low Water Level – Level 3 Reactor Protection System (RPS) actuation occurred during the transfer of reactor coolant makeup from the MDRFP to the condensate/condensate booster pumps. The RPS actuation (scram) was caused by the RPV water level dropping at a faster rate than anticipated by the operating crew. The MDRFP was restarted and water level was quickly recovered. This event was caused by less than adequate operating crew response in shutting down the MDRFP to reduce reactor pressure.

The deficient circuit will remain removed from service until an engineering change to modify the circuit for overload protection is installed. For the second event, operations crews will be trained on the event in simulator training to emphasize the crew's response to challenges, including reactor water level responses to pressure reduction without high pressure feed injection available.

## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Clinton Power Station, Unit 1	05000461	2003	003	01	2 OF 4

## NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

## A. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT:

Unit: 1 Event Date: 12/02/2003 Event Time: 1700 Central Standard Time (CST)

Mode: 1 (Power Operation)

Reactor Power: 088 percent

Reactor Coolant System Temperature: 537 degrees F

Reactor Coolant System Pressure: 1012 psia

## B. DESCRIPTION OF THE EVENT:

On December 2, 2003, at approximately 1700 hours, with the plant in Mode 1, "Power Operations," the reactor was manually scrammed from 88 percent power in response to low feedwater pump suction pressure and reactor pressure vessel (RPV) water level trending downward toward the RPV Low Water Level – Level 3 automatic scram setpoint. Initiating the event was a loss of power to the 480 Volt Unit Substation 1I (1AP19E) causing the 'B' turbine driven reactor feed pump (TDRFP) minimum flow valve to fail open. This resulted in a low pump suction pressure and a trip of both TDRFPs. Immediately following the manual scram, the motor-driven reactor feed pump (MDRFP) automatically started to control water level and pressure.

Operators entered Clinton Power Station (CPS) Emergency Operating Procedure EOP-1, "RPV Control," CPS procedures 4100.01, "Reactor Scram," 4002.01, "Abnormal RPV Level / Loss of Feedwater at Power," and 4200.01, "Loss of AC Power," at 1700 hours.

Following the manual reactor scram, RPV water level reached approximately minus 26 inches. The trip setpoint for the RPV Low Water Level – Level 3 actuation is  $\geq 8.9$  inches. The RPV Low Water Level caused a valid reactor protection system (RPS) actuation and a containment isolation signal for Groups 2, 3 and 20. The containment isolation valves in these three groups are normally closed during power operations. A Level 3 actuation is expected following a high power reactor scram.

Subsequent to the initial event, a second event occurred at approximately 1937 hours with the plant in Mode 3, "Hot Shutdown," when an RPV Low Water Level – Level 3 RPS actuation occurred during the transfer of reactor coolant makeup from the MDRFP to the condensate / condensate booster pumps. The RPS actuation involved an automatic reactor scram and a containment isolation signal caused by the RPV water level dropping at a faster rate than anticipated by the operating crew. The RPV water level reached approximately minus 5 inches during this event. The MDRFP was restarted and water level quickly recovered.

The manual scram and the subsequent containment isolation signal due to the RPV Low Water Level – Level 3 initiation signal involved a valid actuation of the RPS when the reactor was critical. The four-hour ENS notification required by 10CFR50.72(b)(2)(iv)(B) was completed at 1837 hours (CST) (Event #40368). The automatic reactor scram and the second containment isolation signal due to the RPV Low Water Level – Level 3 initiation signal was a valid actuation of the RPS when the reactor was not critical (Update to Event #40368). The eight-hour notification required by 10 CFR 50.72 (b)(3)(iv)(A) for this event was completed at 2145 hours. Both of these events involved a valid actuation of the reactor protection system. Therefore, this LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv)(A).

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FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)	
Clinton Power Station, Unit 1	05000461	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 4	
		2003	003	01		

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

### C. CAUSE OF THE EVENT

The loss of feedwater injection was attributed to a loss of power to the 480 Volt Unit Substation 11 (1AP19E) causing the 'B' TDRFP minimum flow valve to fail open on a loss of power. The cause of the 480 Volt Unit Substation 11 trip was a lack of branch circuit overload circuit protection (i.e., fuse protection) due to a design error. The Potable Water System [KK] Storage Tank immersion heaters [EHTR] were discovered to be installed without overcurrent protection. The Chromalox Model 449260110 heater control panel was not equipped with branch fusing for multiple heaters. The error occurred using a commercial design change process that no longer is being used at Clinton Power Station.

The second scram involved the failure of the Operations crew to maintain reactor water level and pressure within a specified level control band while securing the MDRFP and placing into service the condensate / condensate booster pumps. This event was caused by less than adequate operating crew response in shutting down the MDRFP to reduce reactor pressure.

### D. SAFETY ANALYSIS

There were no actual safety consequences associated with this event. The event was reviewed for analyzed transients discussed in Chapter 15 of the CPS Updated Safety Analysis Report. The analysis determined that this event was within the design basis of the plant.

### E. CORRECTIVE ACTIONS:

A detailed troubleshooting plan was prepared and executed for the loss of the 480 Volt Unit Substation 11 (1AP19E) during the forced outage. The deficient circuit containing the Potable Water Storage Tank immersion heaters has been removed from service and will remain out of service until an engineering change to modify the circuit for overload protection is installed. No corrective actions to prevent recurrence were determined to be necessary since the current design change process is substantially improved compared to the process that was used when the design change error occurred in 1996.

A prompt investigation was conducted with the Operations crew following the event. A separate Condition Report (#188848) was written to capture lessons learned. Training has been conducted for all operating crews on the required actions to plan for and take following a scram to avoid a RPV Low Water Level - Level 3 scram.

Corrective actions to prevent recurrence include additional training for operations crews on the event in simulator training to emphasize the crew's response to challenges, including reactor water level responses to pressure reduction without high pressure feed injection available.

### F. PREVIOUS OCCURRENCES:

Previous losses of feedwater events are identified below.

Licensee Event Report 1992-002-01, "Lockup of Reactor Feed Pump Control Valve During Transfer of Feedwater Control Channels Results in Feedwater Level Transient and Low Reactor Water Level SCRAM."

Licensee Event Report 2000-001-00, "Operation of Mislabeled Switch While Performing Preventive Maintenance on a Circuit Breaker Results in Loss of 4160 Volt 1B Bus, Reactor Water Level Transient and Manual Scram."

Corrective actions from these LER's would not have been expected to prevent the occurrence of this event.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
		2003	- 003	- 01	
Clinton Power Station, Unit 1	05000461	2003	- 003	- 01	4 OF 4

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G. COMPONENT FAILURE DATA:

<u>Manufacturer</u>	<u>Nomenclature</u>	<u>Model</u>	<u>Mfg. Part Number</u>
Chromalox	Immersion heater	449260110	n/a